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| 09/802,017      | 03/08/2001  | Ashley Saulsbury     | 16747-009910US      | 4713             |

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| EXAMINER |
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PORTKA, GARY J

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| ART UNIT | PAPER NUMBER |
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2188

DATE MAILED: 09/05/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Page

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|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/802,017 | <b>Applicant(s)</b><br>SAULSBURY ET AL. |  |
|                              | <b>Examiner</b><br>Gary J Portka     | <b>Art Unit</b><br>2188                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 March 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,8,10,12
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-19 are presented for examination.

***Information Disclosure Statement***

2. The information disclosure statements (IDS) submitted on Sep. 4, 2001, Oct. 1, 2001, and Feb. 20, 2002 (paper nos. 3, 8, and 12 respectively) were considered by the examiner. The IDS submitted on Jan. 8, 2002, was not considered because the cited references were not in the file. If Applicant desires these to be considered, please submit or resubmit these references in response to this action.

***Claim Objections***

3. Claim 5 is objected to because of the following informalities: At line 8, change "on" to "one". Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Hagersten et al., U.S. Patent 5,710,907.
6. As to claim 16, Hagersten discloses the recited method a first processor 311x of accessing memory on a second (another 311x, or 321x or 381x), comprising issuing a request, determining if the data is on the first processor's memory or the second (at 313x, or 323x or 383x), communicating the request to the second if there, accessing the

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memory of the second processor, and communicating the result to the first processor.

See Abstract, Figs. 3A-3F, col. 6 line 5-52, col. 7 lines 1-33.

7. As to claim 17, the memories each are physical memory (for example, when in NUMA mode).

8. As to claim 18, the memories are each caches (for example, when in COMA mode).

9. As to claim 19, the memories comprise mode control inputs that switch from physical memory to cache mode (for example, whether local address space or global, or result of COMA counters to control mode).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hagersten et al., U.S. Patent 5,710,907, in view of Hsu et al., U.S. Patent 6,128,700.

12. As to claim 1, Hagersten discloses a processing core (311x, Fig. 3A), at least one bank of memory (313x) including mode controlling input (for example, whether local address space or global, or result of COMA counters to control mode) controlling mode of the memory between a physical memory mode (NUMA, in which each memory has it's own part of the address space, Fig. 1B) and a cache mode (COMA, in which each memory caches addresses that have been attracted to it's COMA cache 314, see also

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Figs. 2B and 2C). See also Abstract, Figs. 3C, 3E, and 3F, col. 6 lines 25-52, col. 7 lines 1-33. The memory bank is in the mode as recited for each individual access.

Hagersten does not disclose that the memory is DRAM. However, Hsu describes using DRAM for an analogous second level cache (see Abstract), because DRAM cells use less space (thus increasing density) and is less expensive than SRAM (see col. 2 lines 43-58, and col. 3 lines 19-29). The advantages of reducing the space needed while also reducing the cost would have motivated an artisan to implement the second level caches of Hagersten with DRAM. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use DRAM, because it was known to reduce the space needed (or increase the density) and reduce the cost of second level caches.

13. As to claim 2, Hagersten discloses as recited I/O link (interconnect 390, Fig. 3A) and communication and memory controller (interface 315 and MMU 312x), which control, receive, and process requests as recited.

14. As to claim 8, Hagersten discloses the recited invention as described above with regard to claims 1-2.

15. As to claims 3 and 9, 312x and 315 as stated with regard to claim 2 may be seen as the recited first and second controllers respectively.

16. As to claims 4 and 10, in NUMA as stated with regard to claim 1, the addresses and therefore the data is different on different banks.

17. As to claims 5-7 and 11-13, an external memory interface may be seen as the interface to any of the other memories 323x, 383x.

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18. As to claim 14, first and second processor chips is disclosed in Hagersten as cited above.

19. As to claim 15, Hagersten discloses the recited request from first to second processor memory (as cited hereinabove, and further at col. 6 lines 30-43).

**Conclusion**

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Patent No.

6,275,900 B1          Hybrid NUMA/S-COMA coherence system.

6,000,007          Selected sense amps of DRAM used as cache.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary J Portka whose telephone number is (703) 305-4033. The examiner can normally be reached on M-F 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 305-3900.

Gary J Portka  
Primary Examiner  
Art Unit 2188



August 29, 2003